



OA2

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**VOLTAGE REGULATOR**

MINIATURE GLOW-DISCHARGE TYPE

**GENERAL DATA****Electrical:**

Cathode. . . . . Cold

**Mechanical:**

Mounting Position. . . . . Any

Maximum Overall Length . . . . . 2-5/8"

Maximum Seated Length. . . . . 2-3/8"

Length, Base Seat to Bulb Top (Excluding tip) . . . . . 2"  $\pm$  3/32"

Maximum Diameter . . . . . 3/4"

Weight (Approx.) . . . . . 0.3 oz

Bulb . . . . . T-5-1/2

Base . . . . . Small-Button Miniature 7-Pin (JETEC No. E7-1)

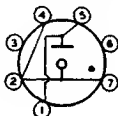
Basing Designation for BOTTOM VIEW . . . . . 5B0

Pin 1 - Anode

Pin 2 - Cathode

Pin 3 - Internal  
Connection-  
Do Not Use

Pin 4 - Cathode



Pin 5 - Anode

Pin 6 - Internal  
Connection-  
Do Not Use

Pin 7 - Cathode

**Maximum and Minimum Ratings, Absolute Values:**AVERAGE STARTING CURRENT<sup>♦</sup>. . . . . 75 max. ma

DC CATHODE CURRENT . . . . . { 30 max. ma

FREQUENCY. . . . . 5 min. ma

AMBIENT-TEMPERATURE RANGE. . . . . 0 max. cps

-55 to +90 °C

**Circuit Values:**Shunt Capacitor. . . . . 0.1 max.  $\mu$ f

Series Resistor. . . . . See Operating Considerations

**CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN**

	Min.	Av.	Max.	
DC Anode-Supply Voltage. . . . .	185 <sup>■</sup>	-	-	volts
Anode Breakdown Voltage. . . . .	-	156	185*	volts
Anode Voltage Drop . . . . .	140 <sup>●</sup>	151	168*	volts
Regulation (5 to 30 ma). . . . .	-	2	6*	volts

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

\* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

← Indicates a change.



## VOLTAGE REGULATOR

### OPERATING CONSIDERATIONS

Sufficient resistance must always be used in series with the OA2 to limit the current through the tube. The value for the series resistor is dependent on the maximum anode-supply voltage and the ratio of the current through the load to the operating current of the OA2, and should be chosen to limit the operating current through the tube to 30 milliamperes at all times after the starting period.

The maximum load current that can be regulated by the OA2 is determined by the minimum and maximum values of the supply voltage. After the value of series resistor for the maximum supply voltage has been calculated as indicated above, it is then in order to determine if this value will permit adequate starting voltage when the supply voltage falls to its minimum value. If adequate starting voltage is not obtained, a new load current of lower value must be used and the calculations repeated. It will be apparent from such calculations that the higher the minimum supply voltage and the smaller the difference between its minimum and maximum values, the higher will be the load current that can be regulated.

When equipment utilizing the OA2 is "turned on", a starting current in excess of the average operating current is permissible as indicated under Maximum Ratings. When the tube is subjected to such high starting currents, the regulated voltage may require up to 20 minutes to drop to its normal operating value. This performance is characteristic of voltage-regulator tubes of the glow-discharge type. Similarly, the regulation is affected by changes in current within the operating current range. For example, the regulation of a tube operated for a protracted period at 5 milliamperes and then changed to 25 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 25 milliamperes. Likewise, the regulation may change somewhat after a long idle period.

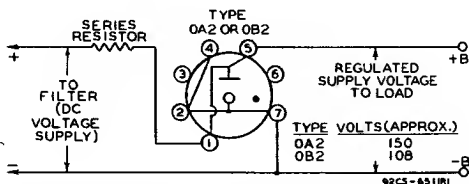
In order to handle more load current, two or more OA2's may be operated in parallel, but such parallel operation requires that a resistance of approximately 100 ohms be used in series with each OA2 in order to equalize division of the current between the paralleled tubes. The disadvantage of this method, of course, is that the use of resistors impairs the regulation which can be obtained.

If the associated circuit has a capacitor in shunt with the OA2, the capacitor should be limited in value to 0.1  $\mu$ f. A larger value may cause the OA2 to oscillate and thus give unstable regulation performance.

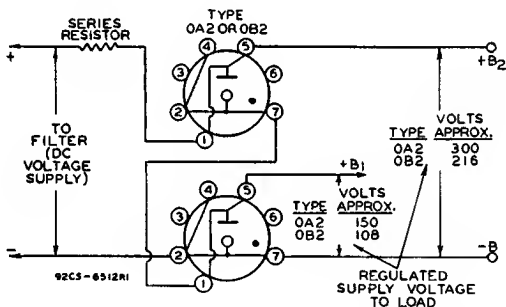


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# OA2 VOLTAGE REGULATOR



Typical circuit to provide regulated supply voltage of approximately 150 or 108 volts to load. Removal of tube from socket removes voltage from load.



Typical circuit using two OA2's or two OB2's to provide regulated supply voltages of approximately 300 or 216 volts and 150 or 108 volts to load. Socket connections are so made that voltage on load is removed when either tube is taken from its socket.

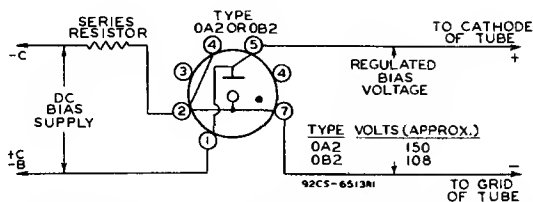
CIRCUIT FOR BIAS-SUPPLY REGULATION  
IS SHOWN ON NEXT PAGE.

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# OA2 VOLTAGE REGULATOR



*Typical circuit for bias-supply regulation. Removal of tube from socket opens B-supply circuit of regulated tubes.*